

THE EXCAVATION OF SITES R11/887, R11/888 AND R11/899, TAMAKI, AUCKLAND

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Abstract. The excavation of adjacent sites R11/887, 888 and 899 in Tamaki are described. Together the sites formed part of an extensive open settlement occupied in the sixteenth century. The rescue nature of the excavations provided a valuable opportunity to examine a greater area of an open settlement than is usually possible. Specific activities were identified at R11/887, including cooking, living, storage and stoneworking areas. Site R11/888 has been interpreted as a specialist site with huts for storage of equipment and a living floor of laid shells. At R11/899 there were several superimposed houses and a group of deep storage pits. The layout of the sites presented an impressive illustration of an unfortified hamlet, probably associated with occupation of the pa at Te Apunga o Tainui.

A number of sites close to the Tamaki River have been interpreted as open settlements. Sullivan (1981:11) suggested that the lava fields between Te Apunga o Tainui and the river contained gardens, storage pits, temporary shelters and possibly house sites. Excavations of open settlement sites in this area have taken place at Hamlins Hill (R11/142, Davidson 1970a, Irwin 1975, Pearce 1975, 1977, Walton 1979, Nichol 1980a), Westfield (R11/898, Furey 1983, 1986) and Hawkins Hill (R11/1394, Coates 1986). The location of these sites and those reported here are shown in Fig.1.

Excavation of these three sites was carried out in 1985 as part of a research programme concentrating on settlement along the banks of the Tamaki River. They were adjacent to Fisher Road (now Carbine Road) 600 m to the west of the river and 800 m to the north-east of the former cone pa of Te Apunga o Tainui (McLennan Hills). The portable artefacts from these excavations are held in the Auckland Institute and Museum under accession number AR 7642. A full report of the excavations is presented in Foster & Sewell (1988).

THE LANDSCAPE

The Fisher Road sites were situated on the main lava flow running north-east from Te Apunga o Tainui. Topographically the area presented a rough and broken landscape, consisting of a number of low basaltic ridges partially covered by, and surrounded by, layered tuff which is likely to have come from the Otahuhu volcanic centre (L. Kermode, pers. comm. 1985). The soils were brown volcanic loams.

Charcoal and landsnail identification suggests that at the time of occupation the three sites were located in pockets of open scrubby vegetation surrounded by broadleaf/podocarp forest.

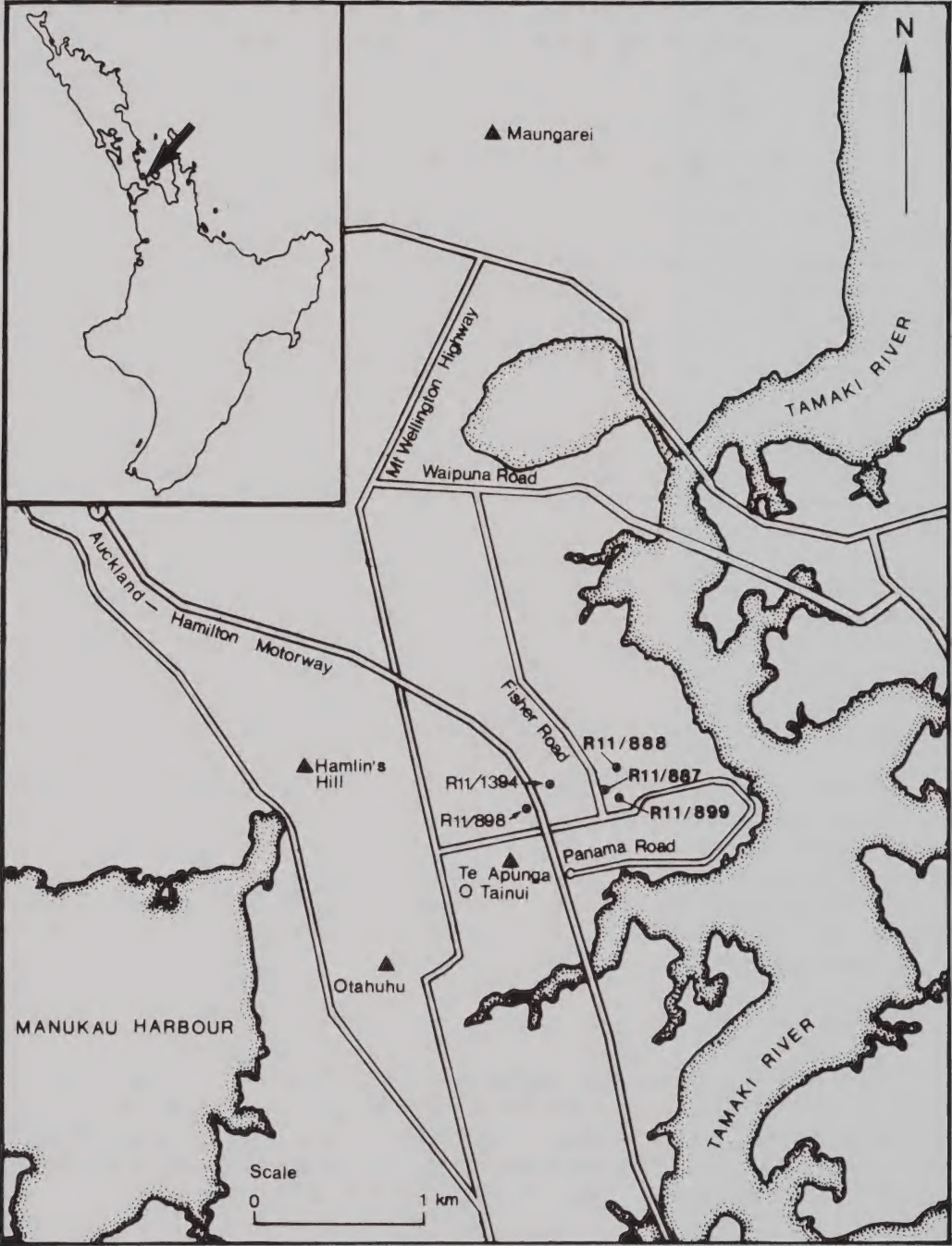


Fig. 1. Location of sites R11/887, 888 and 899 and other sites in the vicinity.

THE EXCAVATIONS

The extent of excavations and spatial relationship of the three sites is shown in Fig. 2. Each site is described separately.

R11/887

This site was situated on a level hill-top bisected by Fisher Road. The hill formed the highest point of the block of land, being some 20 m a.s.l. Before the excavation shell midden, earth ovens, postholes and a pit were visible in the eastern side of the road cutting. Formerly this site stretched across to the western side of the road to where earlier bulldozing had revealed the presence of shell midden and artefacts. Figure 3 shows all the features excavated at this site.

Stratigraphy

The stratigraphy of this site was simple, with four main layers. Cross-sections of the west baulk of the main trench and the eastern road cutting are shown in Fig. 4. Their locations are shown in Fig. 3

Layer 1a: The turf and topsoil. This was characteristically a dark brown friable loam between 50 and 100 mm in depth. The layer contained European material including broken glass bottles, iron straps and staples.

Layer 1b: The midden layer. The matrix was similar in colour and texture to layer 1a but contained shell midden and charcoal. It was present only in the south-western part of the site. It was up to 0.2 m deep in the road cutting but had disappeared some 2 m east of the fenceline.

Layer 2a: The natural subsoil. A yellowish/brown weathered volcanic tuff. Features were cut into this layer. Where layer 1b did not intrude, this layer was separated from layer 1a by a mottled interface containing charcoal flecks.

Layer 2b: Banded yellow/brown tuff.

Excavation results

A number of structural features were excavated. In only one area were these features superimposed, where a probable house and a number of postholes were replaced by a cooking area/midden dump. Elsewhere there was no indication as to whether the features were contemporary. However, as they appeared to be separated into groups, which may reflect different activity areas within the site, the more likely inference is that all should be assigned to a single short phase of occupation.

Over 100 postholes were recorded. They ranged in size from small stakeholes such as those at the south-east of pit A (40 x 60 mm deep) to more substantial ones up to 0.3 m in diameter and up to 0.35 m deep. The fill of the postholes was a dark brown soil.

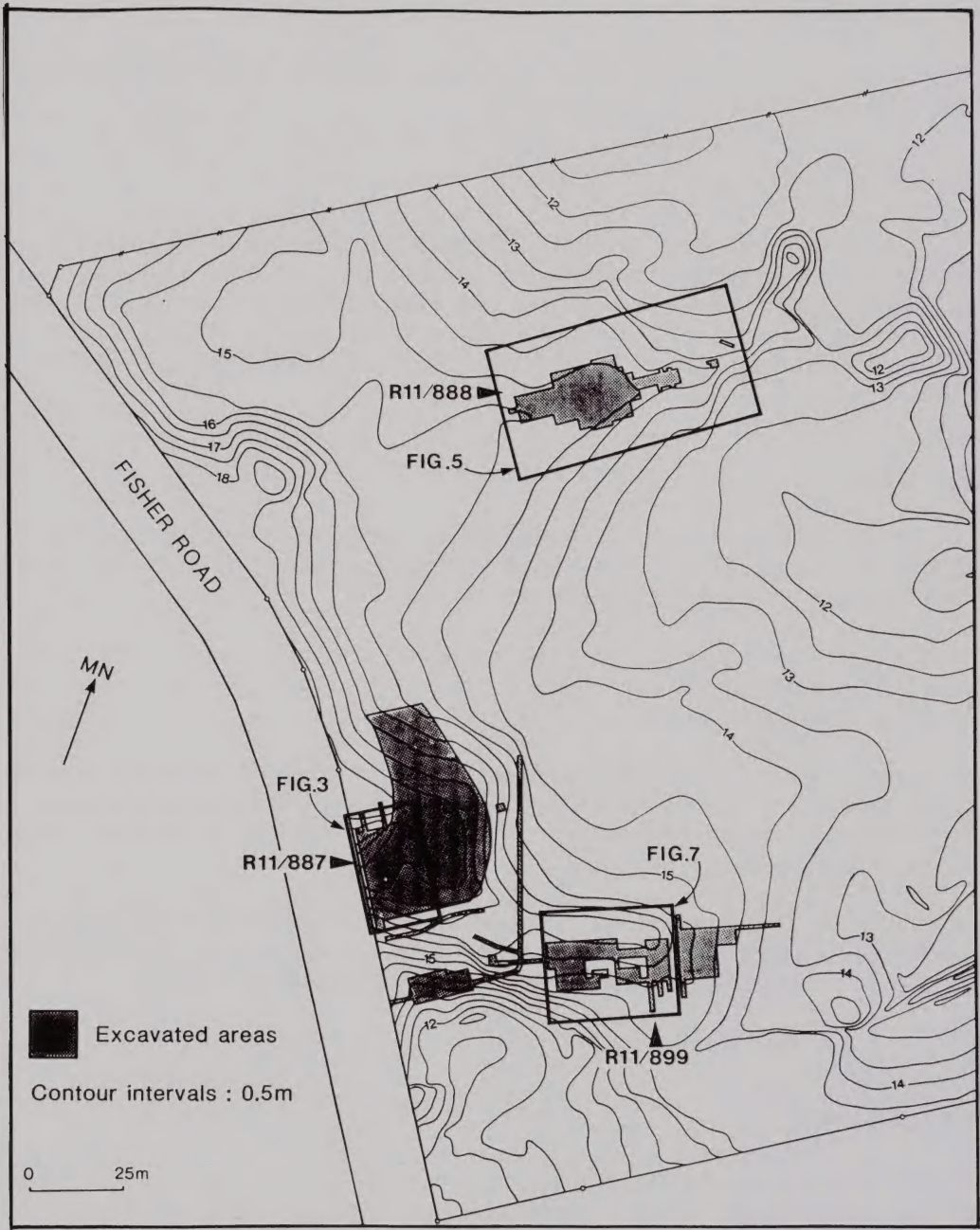


Fig. 2. Sites R11/887, 888 and 899. Contour map showing areas excavated and spatial relationships of the sites.

Almost all the artefacts found at this site occurred in the same general area as the postholes and it is possible that the structures may have been for tasks involving the use of stone tools, adze maintenance and possibly stone tool manufacture (see portable artefact discussion below).

There were six pits with a similar southeast-northwest alignment which may indicate contemporaneity. None of the pits showed any signs of natural in-filling. Table 1 lists the dimensions of all of the pits.

Pit A would appear to have been used for two separate purposes, the first of these was as a fire-pit, indicated by the red ash at its base. A similar pit was also excavated within a house at R11/899 (see below). Pit A was later re-used as an earth oven.

Shallow pits similar to C, D, E and F (of which only a corner remained) have been excavated in the Auckland area at Rahopara, Castor Bay (R10/21, Green 1970:19), Hamlins Hill (Davidson 1970a:110; Walton 1979:107), Motutapu Island (R10/38, Davidson 1970b:39) and Te Pane o Horoiwi (R11/357, Sewell 1986:fig 5). The function of such pits is unclear. Green (1970:19) argued that the pit at Rahopara most likely represented a sunken-floored "domestic unit" (i.e. house) as it would not have provided the consistency of temperature or humidity thought to be decisive factors in the use of deep pits for storing kumara (Groube 1965:93).

Davidson discussed the function of the shallow pits at R10/38 (Davidson 1970b:56). She considered the criteria currently accepted as useful in defining a house: the presence of a stone-lined hearth and "domestic litter". The former she discounted as a universal attribute of a house since recognisable houses at R10/31 and Hamlins Hill did not have them. This is also the case for the houses excavated at R11/899 (discussed below). She felt that the lack of any domestic litter (= stone material) was a strong argument against interpreting the structures at R10/38 as forms of houses, and concluded that they were primarily for storage, although not completely discounting alternative uses (Davidson 1970b:56).

The lack of domestic litter in any of the structures that were clearly houses at R11/899 throws doubt on this means of distinguishing between the use of a shallow pit as a house or for storage. The many ethnographic records (e.g. Phillipps 1952:24, Thompson 1859) of small slightly sunken sleeping houses suggest that some shallow pits are likely to have been used for this purpose. For the particular form of shallow pit under discussion, the presence or absence of stone flakes would appear to be an unsatisfactory criterion by which to define a house. However, by discarding such markers one is no closer to defining the attributes of a house.

Eight earth ovens were excavated. One of these was visible in the road section where two other separate earth ovens were also noted (Fig. 4). They all originated in the layer 1b midden and were cut through into the subsoil beneath. The rocks used for ovenstones were scoria, which, although not ideal for heat retention, would have been in plentiful supply. Many were fire-cracked. Beside the ovens were two small piles of ovenstones.

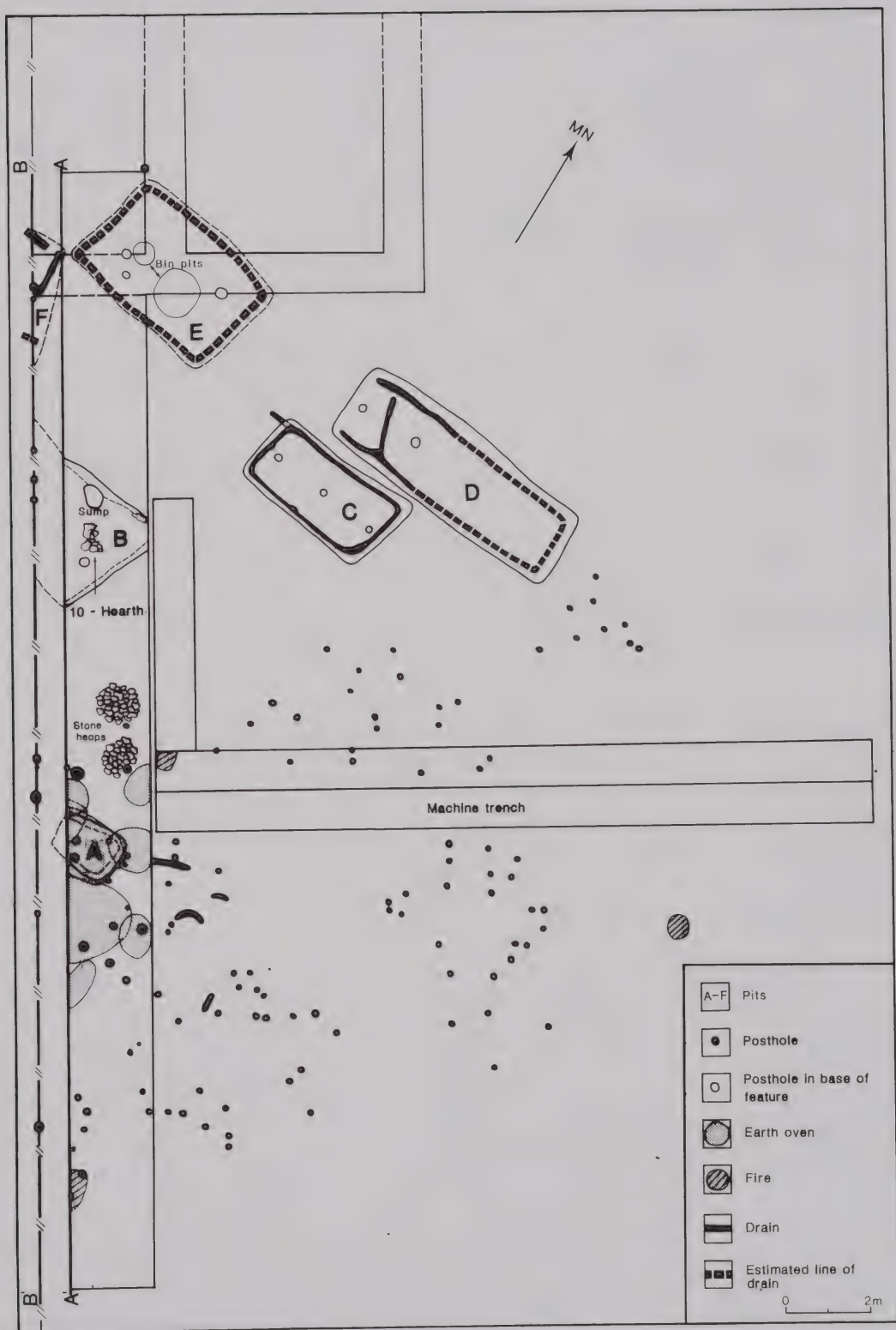


Fig. 3. R11/887. Plan of excavation showing all features and location of cross-sections.

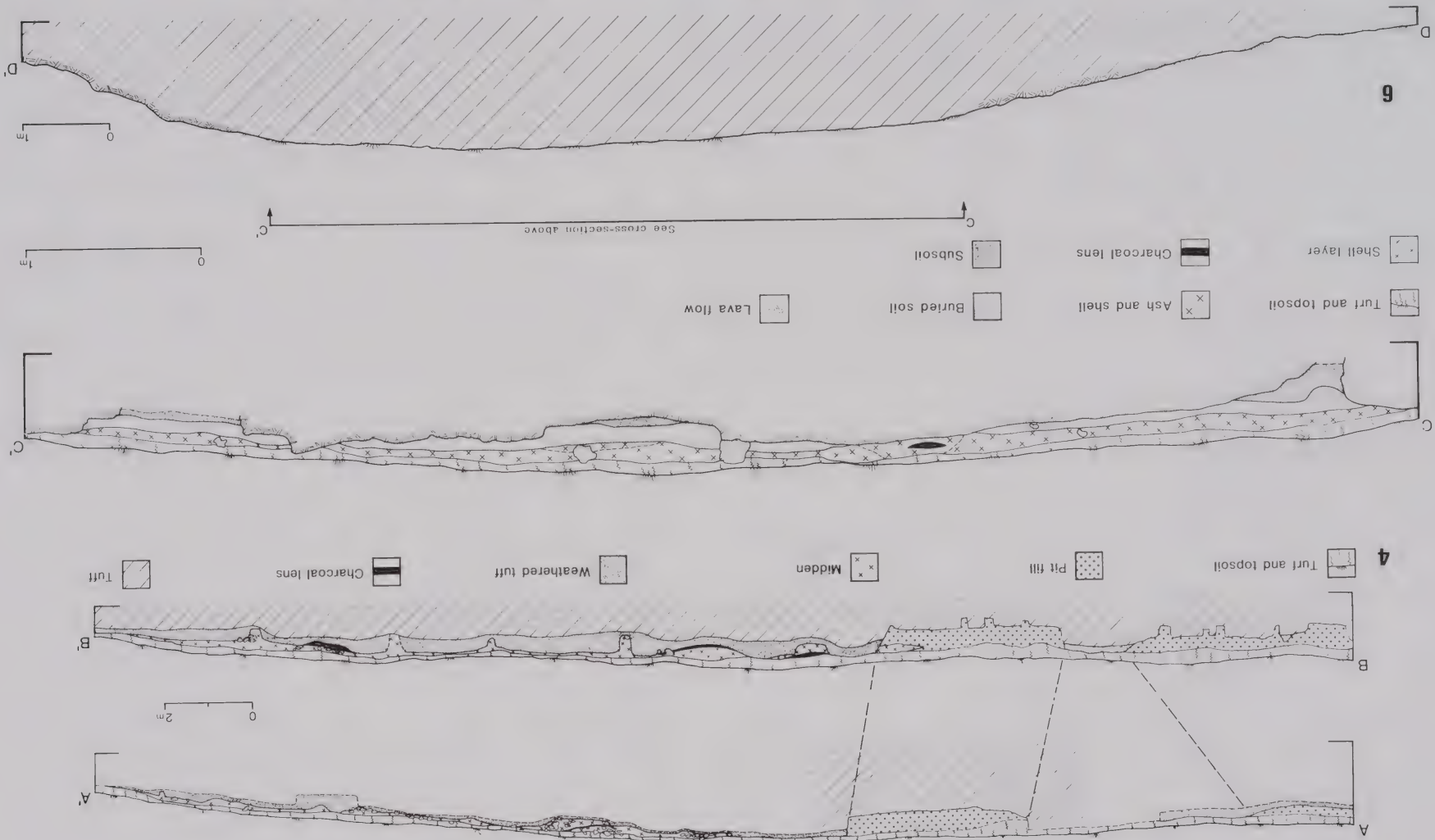


Fig. 4. R11/887. Main cross-sections of the site. Above. West baulk main trench. Below. East baulk of road cutting.

Fig. 6. R11/888. Profile and cross-section of the site.

Table 1. Estimated sizes of pits, Sites R11/887 and R11/899, Fisher Road.

Site	Pit	Length (m)	Width (m)	Depth (m)	Fill
R11/887	A	1.75	1.25	0.26	Scoria stones in matrix of black, greasy soil and fragmentary shell. 5 mm layer of red fire ash at base.
	B	3.0	2.80	0.50	Homogeneous dark brown soil.
	C	3.60	2.10	0.25+	Homogeneous dark brown soil.
	D	1.90	6.20	0.35	Homogeneous dark brown soil.
	E	2.80	4.12	0.35	Homogeneous dark brown soil.
	F	?	?	0.35	Homogeneous dark brown soil.
R11/899	G	4.60	2.70	1.0	Dark brown friable soil and charcoal and lumps of tuff.
	H	5.80	2.30	1.0	Dark brown friable soil and charcoal and lumps of tuff.
	I	3.88	3.08	?	Mottled brown soil.
	J	2.60	1.50	1.50	Dark brown soil, stones, charcoal and lumps of tuff.
	K	4.30	2.0	1.50	Dark brown soil, stones, charcoal and lumps of tuff.
	L	4.10	2.0	0.48	Mottled brown soil and lumps of tuff.
	M	2.0	1.20	0.25	Dark brown soil.
	N	1.40	0.90	0.25	Black/orange mottled soil.
	O	2.50	2.0	?	Dark brown soil.
	P	2.30	1.30	?	Dark brown soil.
	Q	5.0	2.30	0.94	Mottled brown soil.
	R	5.0	2.40	?	Mottled brown soil and charcoal.
	S	7.60	5.90	1.10	Mottled brown soil, tuff and shells.
	T	5.0	2.40	1.0	Yellow brown soil with inclusions of charcoal, grey and orange tuff.
	U	5.10	2.80	1.40	Yellow brown soil and yellow/red tuff.
	V	6.10	3.20	1.10	Yellow brown soil and lenses of charcoal and shells.
	W	5.08	2.28	0.64	Yellow brown soil.
	X	4.0	1.80	?	Yellow brown soil.
	Y	7.0	4.2	1.34	Yellow brown soil and yellow and red tuff inclusions.

These earth ovens formed a distinct activity area dedicated to cooking. One of the ovens was built in and over pit A. There were also a number of postholes underlying the ovens. Whilst some may relate to earlier structures, others may be contemporary with the ovens. Three surface fires and a hearth were also excavated.

R11/888

The surface evidence of this site was a quantity of very crushed shell eroding down the exposed sides of the lava flow. A laid shell floor and a number of structural features were excavated. They are shown in Fig. 5.

Stratigraphy

A profile across the lava flow and a cross-section of the archaeological deposit are shown in Fig. 6. The location of the profile and cross-section are marked on Fig. 5. The stratigraphy was as follows:

Layer 1a: Turf and topsoil 50-100 mm in depth.

Layer 1b: Dark brown friable soil similar in composition to layer 1a but with the addition of flecks of charcoal and, in the north-easterly portion of the area excavated, containing large quantities of shells.

Layer 2: Buried topsoil, dark brown in colour — present only in the most north-easterly area beneath the layer of shells.

Layer 3: Subsoil — brownish yellow.

Layer 4: Basaltic lava.

Excavation results

The features excavated at this site were three structures, two earth ovens, a fire and two groups of postholes, one of which was at the south-west edge of the shell deposit. A layer of shells covered most of the north-eastern portion of the lava ridge decreasing in depth and quantity to the south-west. With the exception of one obsidian flake all the artefactual material was found on the surface of the shell layer. Intermixed with the shells were small lenses of ash not directly associated with any *in situ* fire. The ash was deposited at the same time as the shells. Within the layer of shells there was a hearth 0.35 m in diameter. An earth oven lay to the south-west of the shell layer, and a second cut into Structure A.

The three structures had a similar brownish/yellow fill. No postholes were found around the perimeter of the structures. The interior postholes were cut through the subsoil until the lava flow was reached.

Structure A was rectangular, 8 x 3 m in size, with a central row of postholes. A peripheral drain was dug into the subsoil by 70 - 90 mm. There were additional internal drains which were of similar depth. This structure was cut into by a later earth oven. The three postholes to the south west of this structure may possibly have formed part of it.

Structure B is estimated to have measured 7 x 3 m. The internal postholes did not form a central row. The fill of the drain around the perimeter was not removed, but the dimensions were likely to have been similar to those at Structure A.

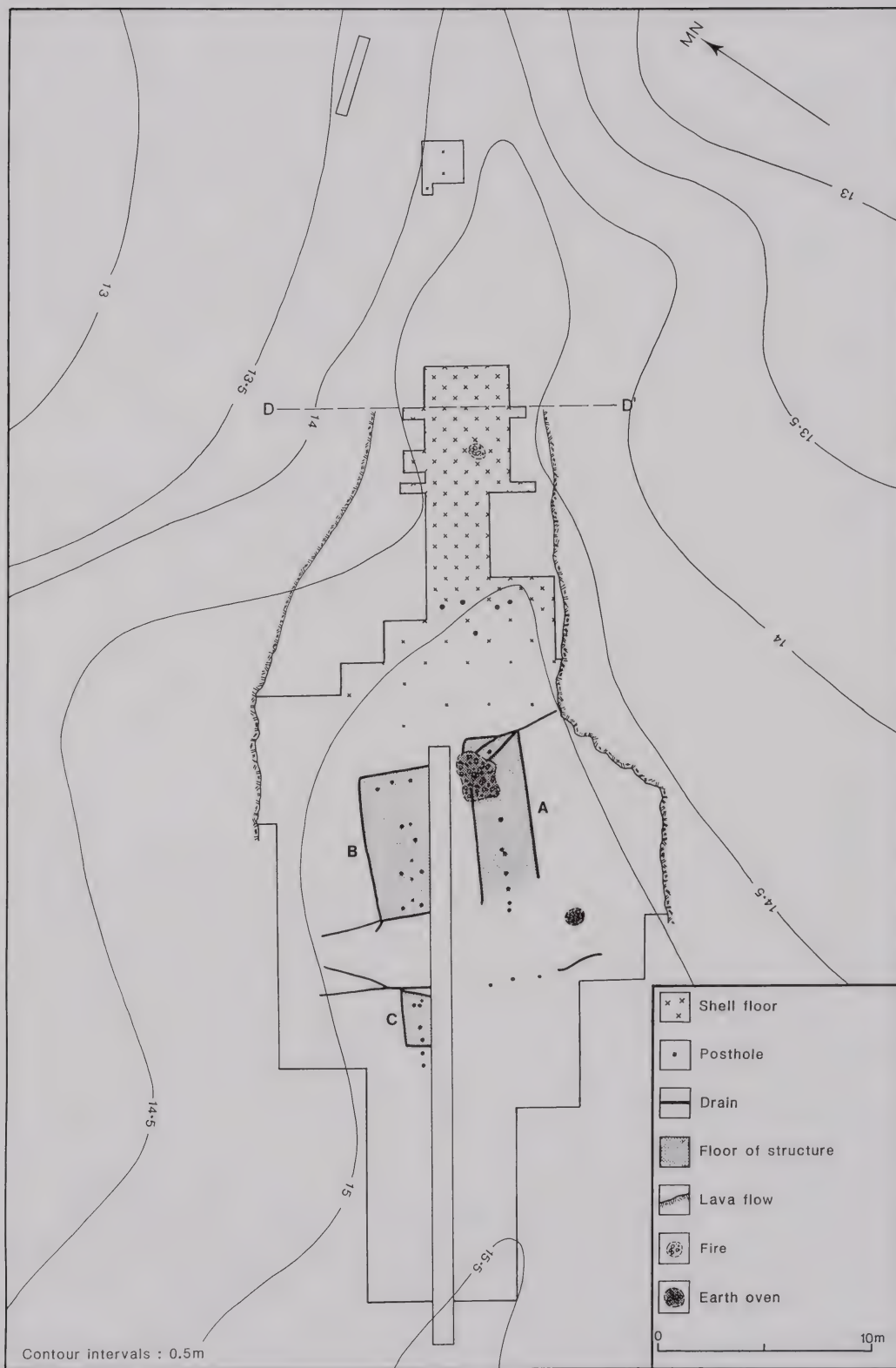


Fig. 5. R11/888. Plan of excavation showing all features and location of profile and cross-section.

Structure C probably measured 2.5 x 1.5 m. The internal postholes formed a central line. The largest posthole showed evidence of both posthole and postmould. The peripheral drain was 60 mm deep. There was a second drain, 0.20 m deep, beside the north eastern end of this structure, and which ran off to the north for 5 m to the edge of the level ridge top.

The structures were above-ground buildings with slightly sunken floors. The lack of corner posts or any substantial posts around the perimeter suggests buildings with the eaves resting directly on the ground. Buildings of similar construction were depicted by some of the early visitors to New Zealand (e.g. Wright 1950: opp. p. 176) and often referred to as storehouses. Crozet recorded that in one village in the Bay of Islands there were three kinds of storehouse — one for tools and spare weapons, one for food (kumara, dried shellfish, fernroot) and calabashes of water and the third for storage of nets, fishing gear, cordage and paddles (Ling Roth 1891:32). It is possible that the structures at this site were used for storage of similar equipment.

The shell layer extended across the end of the lava ridge (Fig. 5) filling up all hollows and undulations. In places the old topsoil was visible beneath the shells. Whilst the presence of shell midden can be indicative of a dump, it is contended in this case that these shells were laid to produce a level living surface. Following Nichol (1980b:96) the shells were examined and found to be food debris rather than beach wrecks.

There are records of shells, together with spoil and rocks, being used as building materials in the construction of terraces in the Auckland area. At Ellett's Mountain an artificial terrace with a depth of nearly 2 m of shells was recorded (J. McKinlay pers. comm. 1986), while at Mount Wellington, Mount Roskill, Taylor's Hill and One Tree Hill similar terraces were found (Davidson 1982:36). At site T11/219, Brier's Block, a rectangular deposit of shells was interpreted as a house floor although no postholes were discovered (Furey 1987:121).

The shells on the lava flow here produced a clean, well-drained and mud-free living surface. It was a deliberately laid deposit rather than a dispersed midden dump. The discrete lenses of ash support this interpretation. The distribution of the stone flakes at the surface of, and coinciding with, the shell floor suggests that they had been deposited after the floor has been laid during its use as a working floor.

R11/899

The evidence here consisted of shell midden, large pits, stone-edged hearths, earth ovens and houses. These features occurred on a flat terrace bounded to the north by a high and conspicuous lava flow. All features excavated are shown in Fig. 7.

Stratigraphy

The stratigraphy of this site was similar to that of R11/887 with the exception that one portion of the site was built up to form a terrace. Cross-sections through the main area of excavations are shown in Fig. 8. The locations of these sections are marked on Fig. 7. The layers were as follows:

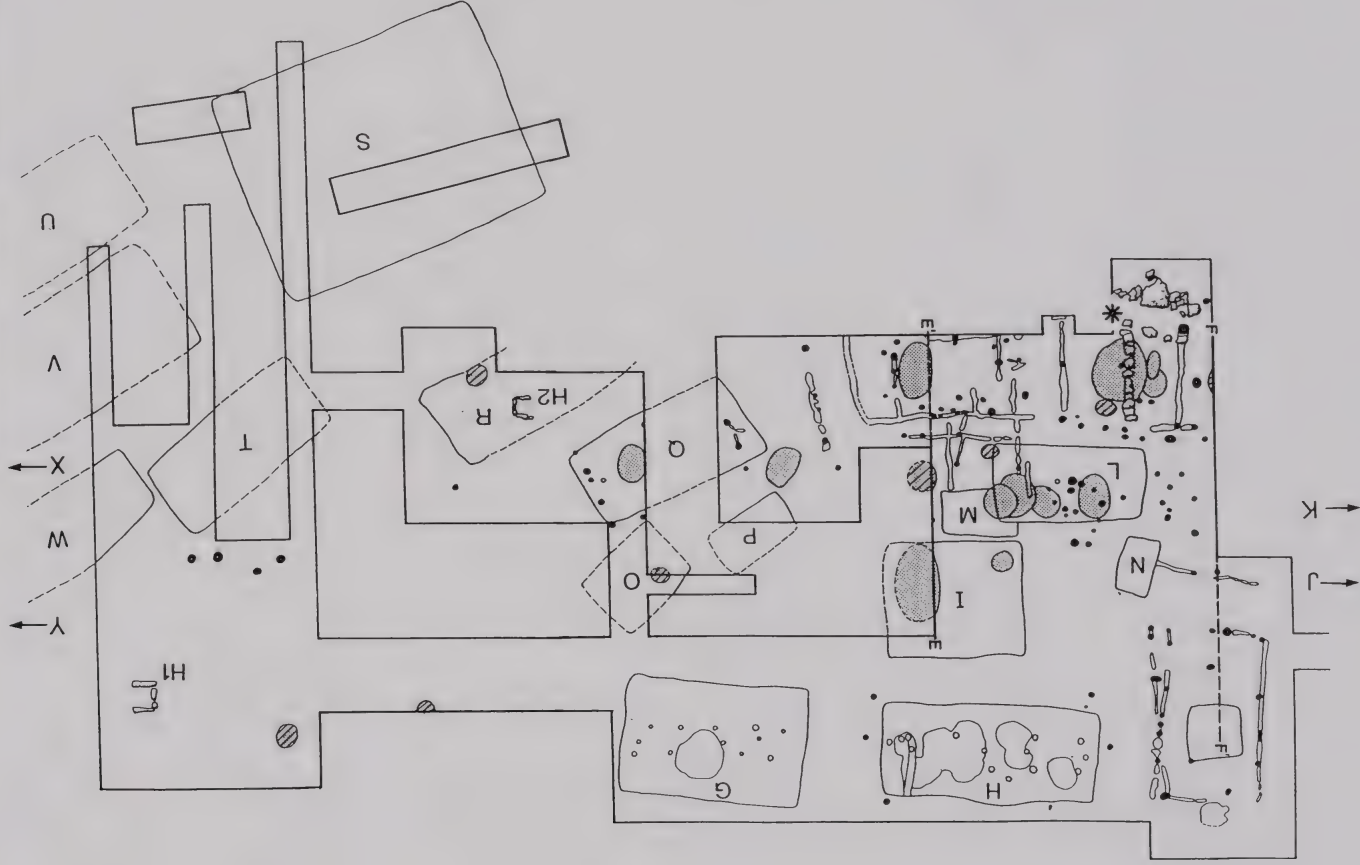
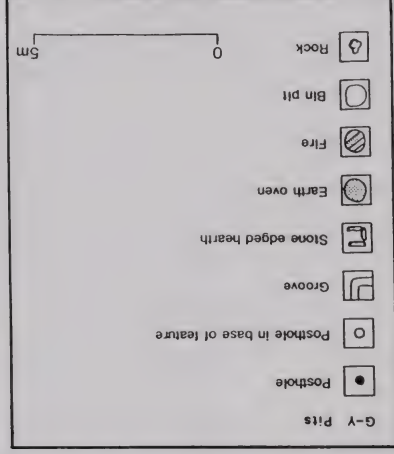


Fig. 7. R11/899. Plan of excavations showing all features and location of cross-sections.

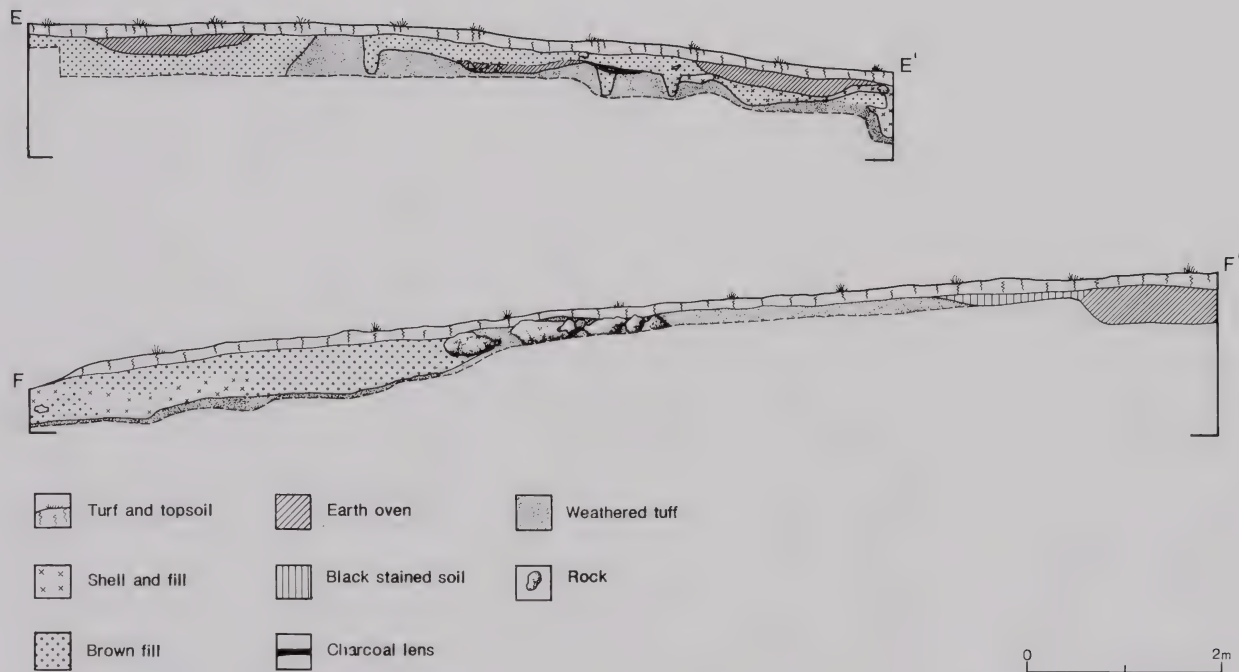


Fig. 8. R11/899. Main cross-sections of the site.

Layer 1: Turf and topsoil 50 - 100 mm in depth.

Layer 2: Redeposited brown friable soil with inclusions of charcoal, rocks, pieces of tuff and in places pockets of shell midden. It had been deposited to the south of the lava flow to form a terrace in order to increase the level living space. In other portions of the site where layer 2 did not occur there was mottled interface between layers 1 and 3a.

Layer 3a: The natural subsoil — a yellow brown weathered tuff.

Layer 3b: Banded tuff.

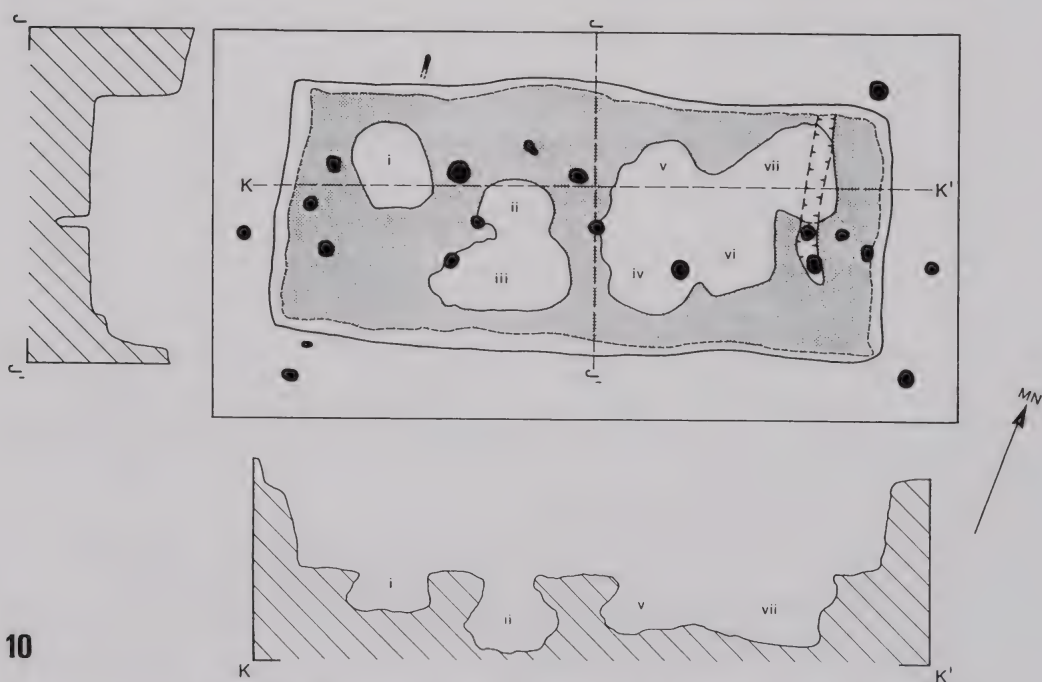
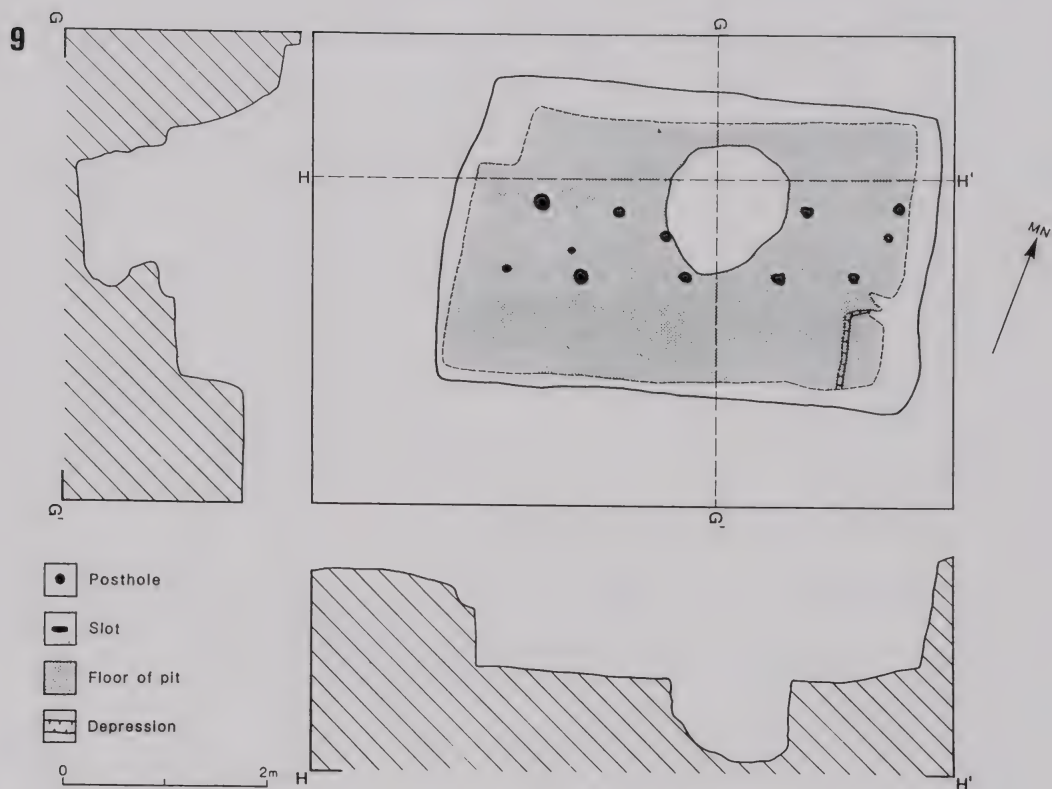
Excavation results

Some of the features excavated were dug prior to deposition of layer 2. (For example pits L and M and the two earth ovens beneath the rock wall marked * on Fig. 7). After the terrace had been built up several houses were constructed and other features were found representing use of the area after the abandonment of some of the houses. The evidence suggests continuous use of the site over a period of time during which houses were built and rebuilt, rather than two or three separate occupations.

Pits G, H, M and N (Fig. 7) were totally excavated. Pits L and Q were partially emptied. The remaining pits (I, O, P & R to Y) were either recorded but not excavated or were located by machine trenching. There was no evidence of natural infilling. The majority of the excavated pits contained an earth oven or the remains of a fire within the hollow caused by the sinking of the original fill. Dimensions and fill of all the pits are set out in Table 1. The excavated pits demonstrated considerable variety both in size and internal features. Pits G and H are illustrated in Figs. 9 and 10.

Pits G and K had circular bin pits cut into their floors, whilst pit H had seven intercutting bin pits, indicating successive use. Although uncommon in the Auckland region, bin pits of this type have been recorded from Mount Roskill (Fox 1980:fig. 10) and R10/26 on Motutapu, where multiple floor pits were present (Sullivan 1972:32). Sullivan suggested that they were used as repositories for seed kumara (1972:42). Other bin pits have been recorded from further afield, from Skipper's Ridge, Coromandel (T10/165, Davidson 1975:11), Kauri Point (U13/45, Green 1963:154) and Kotare Pa, Raglan (R14/8, Pos 1964:112). The floor pits from this site are of similar size and depth to those at R10/26. One posthole in pit H was cut into the fill of bin pit iii, which reinforces this idea of successive use and suggests that the pit was re-roofed at least once, with probably a central row of posts being replaced by a double row. Pit G also contained a corner buttress which extended from the floor to the top of the pit and pit Q an end buttress and a shelf around two sides. Whilst a corner buttress is unusual, they have been recorded at pit F at Hamlins Hill (Davidson 1970a:110), pit J at Kauri Point Open Settlement (Green 1963:154) and at Skipper's Ridge (Davidson 1975:11).

End buttresses occur in many pits — sometimes associated with roof supports or as an entry step (Fox 1974:149). The end buttress in pit Q — used as a step — was comparable to those in pit K at Hamlins Hill (Walton 1979:108) and at three sites on



Figs. 9, 10. 9. R11/899. Plan and profiles of Pit G. 10. R11/899. Plan and profiles of Pit H.

Motutapu — pit 5 at R10/38 (Davidson 1970b:41), pit E at R10/26 (Sullivan 1972:56) and pit 2 at R10/31 (Leahy 1970:64). In composition the buttress closely resembled that in pit 4 at R10/31 (Leahy 1972:18); in both cases the buttress consisted of compacted clay placed in the pit after it had been dug. The internal ledge running along the end and one side wall in pit Q was an interesting attribute. A similar feature was encountered in pit T at Hamlins Hill (Walton 1979:111) and in pit B at R10/31 (Sullivan 1972:35), where Sullivan (1972:39) suggested that the ledge was used to facilitate entry into the pit. As the ledge in pit Q ran along two walls it would appear unlikely that it was dug primarily for that purpose.

There were a number of houses. With the exception of one, all were constructed on the built-up terrace and were superimposed. The evidence for the superimposed houses consisted of grooves and postholes. The grooves were from 0.20 - 0.25 m deep and 0.15 - 0.20 m wide; postholes were found within or alongside the grooves. These were up to 0.34 m deep. The outline of the houses was unclear in the fill of pit L and to the west of this pit.

Not all the grooves and postholes came from the top of the midden-fill layer. It is probable that as one structure was replaced by another more fill was spreading over the living surface. The grooves and postholes indicated that a number of houses were constructed in this area, several with an east-west alignment and at least two on a north-south line.

The line of rocks (marked * on Fig. 7) was present on the same alignment as the north-south grooves. The rocks used were naturally squared and were laid so that their upper surfaces were level. It is likely that these rocks formed a part of the foundations for one of the houses.

Only one of these superimposed houses had any form of heating — an oval firepit. This firepit, together with the adjacent posthole and groove, belonged to one of the earliest houses.

The separate house was of similar construction and found to the north of the superimposed houses (Fig. 7). It measured 2.8 x 6 m (including the porch of 1.4 m width). The postholes varied in depth from 0.10 - 0.26 m. The porch and entrance faced south.

Within the house there was a firepit measuring 1.50 x 1.48 by 0.25 m deep. Both the base and sides of the firepit were burnt. A posthole, postdating the house, was cut into the north-eastern corner of the firepit. The eastern wall of this house would appear to have been replaced.

It is now accepted that structures such as these, with the outline defined by grooves and postholes, were houses. Similar examples have been found at Hamlins Hill (Davidson 1970a:116, Irwin 1975:52, Walton 1979:112, Nichol 1980a:221), Mangakaware II (S15/18, Bellwood 1978:23), Orakei (R11/87, illustrated in Davidson 1984: fig. 101), R10/31 Motutapu (Leahy 1970:62) and Hawkins Hill (Coates 1986:247).

The separate house appears to be one of the best examples of this type of construction found in Auckland to date, with evidence of almost the complete building.

Two stone-edged hearths (marked H1 and H2 on Fig. 7) were excavated. Hearth 1 consisted of six naturally squared scoriaceous basalt rocks set into the subsoil and arranged to form three sides of a rectangle, the internal measurements of which were 0.50 x 0.45 m. There was no evidence to suggest that a fourth side was ever present. Within the hearth were lenses of ash and charcoal. A thin scatter of charcoal was present to the west of the hearth.

Hearth 2 measured 0.40 x 0.32 m. It was also three sided and made from scoriaceous basalt constructed on the compacted fill of pit R. A semi-circle of small pebbles formed the western boundary. It was filled with many layers and lenses of white, grey and red ash and charcoal. Ash and a smear of charcoal spilled to the west of the hearth.

There were four postholes in a line 3 m south of hearth 1 and eight near hearth 2. These few postholes in the same general area as the hearths do not appear to be directly associated with them and do not provide adequate evidence to postulate any structure related to either hearth.

Rectangular stone-edged hearths have often been used as an indicator for the presence of a house (e.g. Groube 1965:44). Examples of houses with such hearths have been found at a number of sites in New Zealand.

In Auckland no stone-edged hearths in direct association with a house have been excavated. Leach (1972:67) recorded such hearths at Mount Roskill, Taylors Hill and One Tree Hill with no definite evidence that they occurred within a structure. At Palliser Bay some stone-edged hearths were recorded without evidence of a surrounding house (Leach 1972:70-71). Further afield in Polynesia stone-edged hearths are well documented both within and outside houses (Green 1979:94). There is sufficient evidence to suggest that stone-edged hearths without houses are not unusual and fall into the general Polynesian pattern. The hearths at R11/899 would appear to have been constructed in the open in the vicinity of houses and they could have formed an outdoor focal point of the settlement.

Numerous earth ovens were found at this site. With the exception of those beneath layer 2 they came from the vicinity of the superimposed houses. The remaining ovens came from the top of the midden/fill layer 2.

There was a small low-lying terrace below and to the west of R11/899 and south-east of R11/887 (Fig. 1.). Excavation of this terrace revealed a single pit (K) and eight earth ovens. A number of postholes in the vicinity of the ovens probably indicate windbreaks or sheds relating to the ovens.

PORTABLE ARTEFACTS

Table 2 lists all the portable artefacts from the three sites by site and category. The formalised artefacts are typical of the Auckland area. Eight adzes and adze roughouts were recovered. They are illustrated in Figs. 11 to 19. The presence of roughouts and reworked adzes (adze 13 reworked as a fine chisel), together with adze flakes (particularly at R11/887 where clusters of adze flakes were found), indicates that adze maintenance was undertaken.

Table 2. Portable artefacts from Sites R11/887, 888 and 899, Fisher Road.

TYPES	SITE		
	R11/887	R11/888	R11/899
Adzes	2	1	4
Roughouts	1		
Polished Flakes	13	1	3
Hammer Stones	2		2
Obsidian Pieces	187	8	68
Stone Pieces	126	16	55
Fishing Sinker		1	

The non-formalised artefacts consisted of obsidian flakes and cores, greywacke flakes and cores and a scattering of other stone material. A total of 263 pieces of obsidian were recovered. Most came from R11/887 (71%) with fewer from R11/899 (26%) and R11/888 (3%) respectively. 36% of the obsidian was green, possibly from Mayor Island. The remainder of the obsidian was grey, with possible sources on Great Barrier Island and from numerous locations on the Coromandel Peninsula. No significant differences were noted in the relative percentages of green to grey obsidian amongst the three sites.

There were 197 other stone flakes from the sites — 64% from R11/887, 28% from R11/899 and 8% from R11/888. The material was essentially greywacke (95.5%) with a few chert (3%) and local volcanic stone (1%) pieces. Many of the greywacke flakes were struck from water rolled cobbles and could have been collected from the shores of the Hauraki Gulf, a major source being Motutapu Island.

In general, while actual numbers of flakes recovered from each site showed considerable variation, the significantly higher number of flakes at R11/887 suggests a more intensive activity concerned with the use and flaking of stone. There was no significant difference in size or shape of obsidian flakes from the three sites. Fredericksen suggested (Foster & Sewell 1988: App. 5) that this material was debitage from tool manufacture, with only two flakes showing any sign of usewear. However, it is possible that the flakes were used for some other function which left no recognisable usewear patterns.



Figs. 11-19. Portable artefacts from sites R11/887, 888 and 899. 11. Adze (R11/887). 12. Broken adze roughout (R11/887). 13. Reworked chisel (R11/887). 14. Adze (R11/888). 15. Fishing sinker (R11/888). 16-19. Adzes (R11/899).

DISCUSSION AND CONCLUSION

Dating

The Radiocarbon dates obtained for the three sites are listed below.

Lab. No.	Years B.P.	Years B.P.
	Old half-life (5568)	New half-life (5730)
NZ 7048	405 $\pm$ 25	415 $\pm$ 25
NZ 7049	380 $\pm$ 40	395 $\pm$ 40
NZ 7064	390 $\pm$ 30	400 $\pm$ 30
NZ 7065	380 $\pm$ 30	395 $\pm$ 30

The dates obtained indicate that the main occupation of all three sites was in the mid to late sixteenth century. There is no stratigraphic link between the dated events, but the close similarity of the dates, together with the excavation evidence, suggests that the sites were likely to be contemporary. The significance of these dates in relation to each other and to the other dated sites in the area (Hawkins Hill, Westfield) has been discussed by Foster (1986), who concluded that, in their probable dates, none of these sites could be distinguished statistically, all are in the same general age range.

Economy

Evidence of the economic base of the inhabitants of these sites may be gained from the analysis of faunal remains (Foster & Sewell 1988:App. 4) and by inference from other excavated evidence.

The content of the faunal samples was similar to that of other Auckland sites, consisting of a number of shellfish species, fish and dog. In particular there were similarities with the other excavated sites in the area (Hamlins Hill, Hawkins Hill, Westfield), where similar shellfish species, primarily cockle (*Chione stutchburyi*), a predominance of snapper (*Chrysophrys auratus*) amongst the fish species and small quantities of dog (*Canis familiaris*) were present.

The shellfish indicated the exploitation of several ecological zones (estuarine, rocky shore and open coastal). Estuarine species predominated. Cockle was the major species present (95%), which along with the other estuarine species could have been collected from the nearby Tamaki River or the Manukau harbour a little further to the west.

A number of fishing techniques were indicated by the types of fish species present. The usual method of taking snapper and trevally (*Caranx geogianus*) was by bait-line, although seine nets were equally effective. The number of other small fish such as small shark, mackerel (*Trachurus declivis*), stargazer (*Geniagnus monopterygius*) and mullet (*Aldrichetta forsteri*) indicate that netting was a major method of capture. The presence of barracouta (*Thyrsites atun*) and kahawai (*Arripis trutta*) suggests the use of trolling lures.

The dog skeletal remains represented all body parts, suggesting that butchery of these animals took place at the site. One pelvis had cut-marks on the ilium which are consistent with the flensing of the flesh off the bones, as discussed by Taylor (1984).

No direct evidence of gardening was found. However, the large number of storage pits suggests that considerable energy was expended in the production of root crops, even allowing that not all pits would have been in use at the same time. Despite attempts to identify areas where gardening took place, no specific evidence could be found that pointed to any particular areas of gardens. Clearly gardens must have been present somewhere in the vicinity. They may have been present and not located or the gardening activities practised may have left no visible trace. A third possibility could be that the gardens were located in some area beyond the block investigated, such as between the settlement and the Otahuhu Creek.

The nature of the settlement

Although one of the most frequently encountered site types in New Zealand is the open settlement, characterised by pits, terraces and/or midden, excavation has been limited and generally only involved small segments of such sites. Consequently it is difficult to assess the nature of settlement at these sites or to compare adequately one such site with another.

As the Fisher Road excavations were of a rescue nature it was possible to undertake extensive area excavation. The research proposal envisaged that such an excavation would add considerably to our knowledge of open settlements and their structure. The excavations reported here revealed a considerable portion of the three sites. They provided sufficient information to assess the nature of settlement of each site and to discuss their relationship to each other and other sites in the vicinity.

Groube's study (1964; 1965) of settlements still remains the basis for discussion of the nature of undefended sites. He ranked settlements of four levels starting with the "minimal domestic unit", which consisted of a number of structural components such as those for storage, dumping and cooking in addition to a house or site for sleeping (Groube 1964:53). The second level — the communal — comprised a number of domestic units and sites of specific communal activities (Groube 1964:56). The third and fourth levels add the natural environment (economic level) and the wider political aspects of a large unit consisting of clusters of communal units (political level) (Groube 1964:58).

Sites R11/887 and 899 fall into the first of Groube's categories. Both contained evidence of structures, storage and cooking. Midden was found at both sites although no areas used exclusively for the dumping of rubbish were found. The evidence at R11/888 was less clear. It did not contain all the elements considered to be indicative of a domestic site, particularly in the lack of storage pits and a discrete cooking area. The most likely explanation for this site is that it was a specialised satellite area of the other sites. This is supported by radio-carbon evidence. The age estimates from the three sites are so close as to indicate their contemporaneity. Together they may be regarded as a single communal unit at Groube's second level — a hamlet. The sites within this hamlet encompassed a wide range of activities including living, the preparation and cooking of food and storage. In addition there were certain locations where specialised activities took place. These were an area where stone tools were used and possibly manufactured at R11/887 and an open working floor at R11/888 (possibly for manufacture and maintenance of nets).

The two other sites which have been excavated in the same lava field (Westfield and Hawkins Hill) were also domestic units with evidence of houses, cooking, midden dumping and storage. In addition the Westfield site contained a specialised working area which was interpreted as a place where woodworking was undertaken (Furey 1986:21). These sites have features in common with the open settlement at Fisher Road and are of similar age. It is suggested that all of these sites would have been occupied by contemporary, extended, and probably related, family groups.

The settlement on Hamlins Hill is very similar to the sites around Te Apunga o Tainui. All were occupied in the same general time range, were located close to one of the canoe portages and contained a similar range of features. At Hamlins Hill about 500 m² was excavated and the structures indicated that it was part of a large settlement with construction of consecutive buildings in the same locality. This is very like the pattern at Fisher Road, where occupation is interpreted as continuous over a period of time with houses being built and re-built and no indication of any significant breaks in occupation.

Groube (1965:52) argued that the pa was the focus of a more extensive settlement pattern with everyday economic activity undertaken in dispersed hamlets or huts. The use of the pa as a focal point in studying prehistoric settlement patterns in New Zealand has been used with success by later archaeologists such as Irwin (1985) in understanding the settlement patterns of the Poutu Peninsula, northwest of Auckland, and by Phillips in her study of the Karikari peninsula in Northland (Phillips 1987). In discussing the political unit Groube (1965:14) pointed out the problem of interpreting such a unit without adequate time control. Within the settlements excavated around Te Apunga o Tainui the dates show occupation in the 16th century with no evidence of any earlier occupation. Although no dates are available for occupation of the cone it would seem reasonable to assume that it was in use at the same time as these surrounding hamlets and was in fact the political centre of these settlements.

The Otahuhu portage was one of the major portages between the Waitemata and Manukau Harbours and the inhabitants of the pa at Te Apunga o Tainui and its associated open settlements must have had considerable control over its use. In this respect it is of note that close examination of the remainder of the Fisher Road block did not indicate the presence of any significant habitation sites between those excavated and the Tamaki River. This can be seen as supporting the proposition that the focus of settlement in this area was on the pa and the portage rather than on the main Tamaki River.

The interpretation of the excavations at Fisher Road presented here suggests that sites R11/887, 888 and 899 formed parts of a single hamlet. Horticulture and food storage were major subsistence activities, although it is clear that fishing and shellfishing were also of significance. There is evidence of tool manufacture, use and maintenance. The evidence also suggests that at least one specialised satellite area was present. The settlement was of a permanent nature, as evidenced by substantial houses and extensive storage facilities, and was probably occupied as a home base over an extended period of time by one group of people during the 16th century.

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